APPENDIX B
CLAIM SUPPORT IN
Application No. 08/619,903

89. An intermammary artery access retractor comprising;	figures 8-16, and 19-22.
	page 1, lines 9-11: "This invention relates to retractors, and more particularly to an access platform that facilitates access to the interior of the chest cavity during surgical procedures;"
	page 8, lines 6-8: "The access platform of the present invention serves to facilitate the dissection of an internal mammary artery (IMA), including both proximal and distal dissection;"
	page 12, lines 2-12: "Referring now in detail to the drawings, therein illustrated are novel embodiments of an access platform that facilitates the dissection of an internal mammary artery (IMA), including both proximal and distal dissection, and access to the heart during a "beating heart" Coronary Artery Bypass Graph (CABG) procedure by increasing the surgeon's working space and visual access. Turning to Figure 1, the access platform 10 incorporating a preferred embodiment of the present invention, is shown disposed over the outline of a patient's chest P. An incision in the patient's chest P adjacent to the LIMA (shown in phantom) exposes an LAD artery on the exterior of the patient's heart."
a frame having a crossbar, a fixed retractor arm and a movable retractor arm, said movable arm being movable toward or away from the fixed arm;	page 12, line 12-page 13, line 7: "Preferably, the access platform 10 comprises a pair of blades 50 and 51, a pair of support pads 80 and 81, a pair of tissue retractors 70 and 71, a pair of torsional members 30 and 31, and a spreader member 12. The torsional members 30 and 31 and the spreader member 12 preferably extend away from the blades 50 and 51 and the tissue retractors 70 and 71 and, thus, the chest incision, in a plane relatively parallel to the patient's chest. As a result, the access platform 10 advantageously maintains a low profile that remains substantially clear of the surgeon's working space. Referring to Figure 2, the components of the access platform 10 are shown less the tissue retractors 70 and 71. The spreader member 12 preferably comprises a rotatable hub 14 including operably coupled upper and lower hub halves 17 and 16. A pair of spreader arms 19 and 18 extend from the upper and lower hubs 17 and 16, respectively, and connect to the torsional members 31 and 30, respectively. Preferably, the hub 14 includes a harmonic gear drive 20 used to rotate the upper hub half 17 relative to the lower hub half 16 and, thus, spread or close the spreader arms 18 and 19 to retract or relax the patient's ribs;"
	page 14, line 17-page 15, line 5: "Blade arms 56 and 57 interconnect the blades 50 and 51 to the rest of the access platform 10. The blade arms 56 and 57 comprise arm stems 62 and 63 received in sockets 34 and 35 in torque bases 32 and 33. The sockets 34 and 35 and the stems 62 and 63 are constructed such that the blade arms 56 and 57 are releasably connected to the torque bases 32 and 33. The stems 62 and 63, which extend relatively horizontally from the torque bases 32 and 33, include pivot sections 60 and 61 extending therefrom. Branches 58 and 59 extend outwardly and downwardly away from the pivot sections 60 and 61 and are attached to the throats 54 and 55 of the blades 50 and 51. This blade arm construction advantageously directs the bulk of the access platform 10 away from the surgeon's working area;"

page 23, lines 2-8: " A second embodiment of the access platform 110 is shown in Figures 8, 9 and 10. The second embodiment of the access platform 110 includes a spreader member 112 preferably comprising a horizontally disposed rack 120 and pinion housings 121 and 122 slidably disposed over the rack 120. The pinion housings 121 and 122 rotatably retain pinions 123 and 124 driven by levers 125 and 126;"

page 23, lines 18-24: " The blade arms 146 and 147 further comprise pivot sections 150 and 151 extending horizontally from the stems 152 and 153. Branches 148 and 149 extend downwardly and outwardly from the pivot sections 150 and 151 of the blade arms 146 and 147 to position the remainder of the access platform 110 away from the surgeon's working area. Branches 148 and 149 attach to blades 140 and 141;"

page 27, lines 9-22: " A third embodiment of the access platform 210 is shown in Figures 11 and 12. The third embodiment of the access platform 210 includes a spreader member 212 comprising a horizontally-disposed rack 214 and pinion housings 216 and 218 slidably disposed over the rack 214. Pinions 220 and 222 are rotatably retained in the pinion housings 216 and 218 and driven by levers 224 and 226.

Blades 230 and 231 comprise elongated vane sections 232 and 233 extending from recessed throat sections 234 and 235. Blade arms 236 and 237 have branches 238 and 239 which extend downwardly and outwardly from horizontally disposed stems 240 and 241 and connect to the blades 230 and 231. The stems 240 and 241 of the blade arms 236 and 237 are releasably received in sockets 217 and 219 in the pinion housings 216 and 218;"

page 29, lines 1-page 30, line 2: "A fourth embodiment is shown in Figures 13A-15. The access platform 310 of the fourth embodiment includes a spreader member 312 comprising a rack 320, a housing 322 slidably received over the rack 320, a pinion 324 rotatably retained in the housing 322 and a lever 326 connected to the pinion 324. A spreader base 328 is attached to one end of the rack 320. A pair of parallel spaced fingers 330A and 330B that extend from the housing 322. Similarly, a pair of parallel spaced fingers 332A and 332B extend from the spreader base 328 and are positioned parallel to the fingers 330A and 330B extending from the housing 322.

A pair of blade arms 338 and 340 include branch sections 346 and 348 that extend downwardly from central portions 339 and 341 and connect to blades 350 and 352. Stem portions 342 and 344 extend from the central portions 339 and 341 opposite the branch sections 346 and 348. The stem 342 extends between and is pivotally mounted to fingers 330A and 330B at a pivot 331. Likewise, stem 344 extends between and is pivotally mounted to fingers 332A and 332B at a pivot 333. As a result, the blade arms 338 and 340 rotate about an axis of rotation A_1 that is parallel to the rack 320. This construction advantageously enables the access platform 310 to address a thoracotomy positioned anywhere along the chest wall without intruding on the surgeon's working space. If the thoracotomy is located on the lateral side of the chest wall the spreader member 312, the spreader base 328 and the housing 322 are simply pivoted out of the surgeon's way;"

page 30, lines 6-24: "Alternatively, as shown in Figure 13B, the access platform 310 of the fourth embodiment includes a pair of links 360 and 362 interposed and hingedly interconnected to the blade arms 338 and 340, respectively, and the housing 322 and spreader base 328, respectively. The links 360 and 362 comprise link bodies 364 and 366, respectively, and parallel spaced fingers 368A and 368B and 369A and 369B, respectively, extending from the link bodies 364 and 366. The link bodies 364 and 366 extend between and pivotally mount to the fingers 330A and 330B and 332A and 332B at pivots 331 and 333, respectively. Likewise, the stems 342 and 344 of the blade arms 338 and 340 extend between and pivotally mount to the fingers 368A and 368B and 369A and 369B at pivots 363 and 365. As a result, the blade arms 338 and 340 and the links 360 and 362 rotate about parallel axes of rotation A_1 and A_2 that are parallel to the rack 320. This construction further enables the access platform 310 to address a thoracotomy positioned anywhere along the chest wall without intruding on the surgeon's working space by easily pivoting the spreader base 328, the housing 332 and the rack 320 out of the surgeon's way;"

page 32, lines 9-22: "Alternatively, a fifth embodiment of the access platform 310 is shown in Figure 16 to comprise a combination of components from the first and fourth embodiments. More particularly, the torsional members 30 and 31 of the first embodiment are interposed between and operably connected to the fingers 330A and 330B and the housing 322, and interposed between and operably connected to the fingers 332A and 332B and the spreader base 328, respectively. In addition, the support pads 80 and 81 of the first embodiment are adjustably attached to the fingers 330A and 332B. By including the torsional members 30 and 31 and the support pads 80 and 81, a second axis of rotation A_2 is provided. Thus, as in the first embodiment, the torsional members 30 and 31 enable the access platform 310 to vertically displace the blades 350 and 352 and the retracted ribs;"

page 34, line 1-page 35, line 2: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient.

A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs.

Torsional members 460 and 462 are attached to the top of the stachion racks 430 and 432. Blade arms 474 and 476 extend outwardly from torsional members and attach to blades 470 and 472. The torsional members comprise inner hubs 461 and 465 rotatably received in and operably connected to outer hubs 463 and 467. Locking levers 464 and 466 lock the outer hubs 463 and 467 in place relative to the inner hubs 461 and 465;"

page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613.

A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"

	page 38, lines 2-20: " The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624;"

a standard retractor blade mounted on said fixed arm;	page 12, lines 12-15: "Preferably, the access platform 10 comprises a pair of blades 50 and 51, a pair of support pads 80 and 81, a pair of tissue retractors 70 and 71, a pair of torsional members 30 and 31, and a spreader member 12.;"
	page 14, line 10-page 15, line 5: "Referring to Figure 2, the blades 50 and 51 preferably include elongated vanes 52 and 53, which slide beneath a plurality of the patient's ribs, and recessed arcuate throats 54 and 55 that receive the patient's ribs that are adjacent to the chest incision. The benefits of the recessed throats 54 and 55 and the elongated vanes 52 and 53 will be discussed below with regard to the operation of the access platform 10. Blade arms 56 and 57 interconnect the blades 50 and 51 to the rest of the access platform 10. The blade arms 56 and 57 comprise arm stems 62 and 63 received in sockets 34 and 35 in torque bases 32 and 33. The sockets 34 and 35 and the stems 62 and 63 are constructed such that the blade arms 56 and 57 are releasably connected to the torque bases 32 and 33. The stems 62 and 63, which extend relatively horizontally from the torque bases 32 and 33, include pivot sections 60 and 61 extending therefrom. Branches 58 and 59 extend outwardly and downwardly away from the pivot sections 60 and 61 and are attached to the throats 54 and 55 of the blades 50 and 51. This blade arm construction advantageously directs the bulk of the access platform 10 away from the surgeon's working area;"
	page 23, line 18-page 24, line 2: "The blade arms 146 and 147 further comprise pivot sections 150 and 151 extending horizontally from the stems 152 and 153. Branches 148 and 149 extend downwardly and outwardly from the pivot sections 150 and 151 of the blade arms 146 and 147 to position the remainder of the access platform 110 away from the surgeon's working area. Branches 148 and 149 attach to blades 140 and 141. The blades 140 and 141 comprise elongated vane sections 142 and 143 extending outwardly from recessed throat sections 144 and 145;"
	page 27, lines 16-22: " Blades 230 and 231 comprise elongated vane sections 232 and 233 extending from recessed throat sections 234 and 235. Blade arms 236 and 237 have branches 238 and 239 which extend downwardly and outwardly from horizontally disposed stems 240 and 241 and connect to the blades 230 and 231. The stems 240 and 241 of the blade arms 236 and 237 are releasably received in sockets 217 and 219 in the pinion housings 216 and 218;"
	page 29, lines 11-13: "A pair of blade arms 338 and 340 include branch sections 346 and 348 that extend downwardly from central portions 339 and 341 and connect to blades 350 and 352;"

page 32, lines 9-22: "Alternatively, a fifth embodiment of the access platform 310 is shown in Figure 16 to comprise a combination of components from the first and fourth embodiments. More particularly, the torsional members 30 and 31 of the first embodiment are interposed between and operably connected to the fingers 330A and 330B and the housing 322, and interposed between and operably connected to the fingers 332A and 332B and the spreader base 328, respectively. In addition, the support pads 80 and 81 of the first embodiment are adjustably attached to the fingers 330A and 332B. By including the torsional members 30 and 31 and the support pads 80 and 81, a second axis of rotation A_2 is provided. Thus, as in the first embodiment, the torsional members 30 and 31 enable the access platform 310 to vertically displace the blades 350 and 352 and the retracted ribs;"

page 34, line 1-page 35, line 2: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient.

A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs.

Torsional members 460 and 462 are attached to the top of the stachion racks 430 and 432. Blade arms 474 and 476 extend outwardly from torsional members and attach to blades 470 and 472. The torsional members comprise inner hubs 461 and 465 rotatably received in and operably connected to outer hubs 463 and 467. Locking levers 464 and 466 lock the outer hubs 463 and 467 in place relative to the inner hubs 461 and 465;"

	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
an adjustable lifter blade mounted on said movable retractor arm;	page 12, lines 12-15: "Preferably, the access platform 10 comprises a pair of blades 50 and 51, a pair of support pads 80 and 81, a pair of tissue retractors 70 and 71, a pair of torsional members 30 and 31, and a spreader member 12.;"
	page 14, line 10-page 15, line 5: "Referring to Figure 2, the blades 50 and 51 preferably include elongated vanes 52 and 53, which slide beneath a plurality of the patient's ribs, and recessed arcuate throats 54 and 55 that receive the patient's ribs that are adjacent to the chest incision. The benefits of the recessed throats 54 and 55 and the elongated vanes 52 and 53 will be discussed below with regard to the operation of the access platform 10. Blade arms 56 and 57 interconnect the blades 50 and 51 to the rest of the access platform 10. The blade arms 56 and 57 comprise arm stems 62 and 63 received in sockets 34 and 35 in torque bases 32 and 33. The sockets 34 and 35 and the stems 62 and 63 are constructed such that the blade arms 56 and 57 are releasably connected to the torque bases 32 and 33. The stems 62 and 63, which extend relatively horizontally from the torque bases 32 and 33, include pivot sections 60 and 61 extending therefrom. Branches 58 and 59 extend outwardly and downwardly away from the pivot sections 60 and 61 and are attached to the throats 54 and 55 of the blades 50 and 51. This blade arm construction advantageously directs the bulk of the access platform 10 away from the surgeon's working area;"

page 23, line 18-page 24, line 2: "The blade arms 146 and 147 further comprise pivot sections 150 and 151 extending horizontally from the stems 152 and 153. Branches 148 and 149 extend downwardly and outwardly from the pivot sections 150 and 151 of the blade arms 146 and 147 to position the remainder of the access platform 110 away from the surgeon's working area. Branches 148 and 149 attach to blades 140 and 141. The blades 140 and 141 comprise elongated vane sections 142 and 143 extending outwardly from recessed throat sections 144 and 145;"
page 27, lines 16-22: " Blades 230 and 231 comprise elongated vane sections 232 and 233 extending from recessed throat sections 234 and 235. Blade arms 236 and 237 have branches 238 and 239 which extend downwardly and outwardly from horizontally disposed stems 240 and 241 and connect to the blades 230 and 231. The stems 240 and 241 of the blade arms 236 and 237 are releasably received in sockets 217 and 219 in the pinion housings 216 and 218;"
page 29, lines 11-13: "A pair of blade arms 338 and 340 include branch sections 346 and 348 that extend downwardly from central portions 339 and 341 and connect to blades 350 and 352;"
page 32, lines 9-22: "Alternatively, a fifth embodiment of the access platform 310 is shown in Figure 16 to comprise a combination of components from the first and fourth embodiments. More particularly, the torsional members 30 and 31 of the first embodiment are interposed between and operably connected to the fingers 330A and 330B and the housing 322, and interposed between and operably connected to the fingers 332A and 332B and the spreader base 328, respectively. In addition, the support pads 80 and 81 of the first embodiment are adjustably attached to the fingers 330A and 332B. By including the torsional members 30 and 31 and the support pads 80 and 81, a second axis of rotation A_2 is provided. Thus, as in the first embodiment, the torsional members 30 and 31 enable the access platform 310 to vertically displace the blades 350 and 352 and the retracted ribs;"

page 34, line 1-page 35, line 2: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient.

A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs.

Torsional members 460 and 462 are attached to the top of the stachion racks 430 and 432. Blade arms 474 and 476 extend outwardly from torsional members and attach to blades 470 and 472. The torsional members comprise inner hubs 461 and 465 rotatably received in and operably connected to outer hubs 463 and 467. Locking levers 464 and 466 lock the outer hubs 463 and 467 in place relative to the inner hubs 461 and 465;"

page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613.

A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"

tilting means for tilting said retractor to lift a portion of a ribcage to provide improved access to the intermammary artery.	page 12, lines 12-page 13, line 7: "Preferably, the access platform 10 comprises a pair of blades 50 and 51, a pair of support pads 80 and 81, a pair of tissue retractors 70 and 71, a pair of torsional members 30 and 31, and a spreader member 12. The torsional members 30 and 31 and the spreader member 12 preferably extend away from the blades 50 and 51 and the tissue retractors 70 and 71 and, thus, the chest incision, in a plane relatively parallel to the patient's chest. As a result, the access platform 10 advantageously maintains a low profile that remains substantially clear of the surgeon's working space. Referring to Figure 2, the components of the access platform 10 are shown less the tissue retractors 70 and 71. The spreader member 12 preferably comprises a rotatable hub 14 including operably coupled upper and lower hub halves 17 and 16. A pair of spreader arms 19 and 18 extend from the upper and lower hubs 17 and 16, respectively, and connect to the torsional members 31 and 30, respectively. Preferably, the hub 14 includes a harmonic gear drive 20 used to rotate the upper hub half 17 relative to the lower hub half 16 and, thus, spread or close the spreader arms 18 and 19 to retract or relax the patient's ribs;"
	page 16, lines 3-20: " The torsional members 30 and 31 are operably connected to the torque bases 32 and 33 and the spreader arms 18 and 19 to enable the access platform 10 to both laterally retract and vertically displace a patient's ribs R. Thus, the torsional members 30 and 31 enable the access platform 10 to be advantageously self-contained such that the force necessary to spread and vertically displace a patient's ribs, and the force necessary to depress the patient's sternum, is applied by the access platform 10 itself rather than through additional external devices. The torsional members 30 and 31 preferably comprise a reduction gear assembly 40 (see Figure 4). The reduction gear assembly 40 comprises a drive nut 42 rotatably captured on the end of the shaft of the spreader arm 18 or 19, a first shaft 45 axially extending from the spreader arm 18 or 19, and a second shaft 47 extending from the torque base 32 or 33. the second shaft 47 is rotatably captured over the first shaft 45 by a shoulder screw 49;"
	page 26, lines 6-17: "The pinion housings 121 and 122 rotatably retain pinions 123 and 124 driven by levers 125 and 126. Torsional members 130 and 131 preferably comprise curved racks 132 and 133 slidably received within pinion housings 134 and 135. The pinion housings 134 and 135 are fixedly attached to the pinion housings 122 and 121. The pinion housings 134 and 135 rotatably retain pinions 136 and 137 driven by levers 138 and 139. Sockets 154 and 155 are formed in the lower ends of the curved racks 132 and 133. Stems 152 and 153 of blade arms 146 and 147 are releasably received by and horizontally extend from the sockets 154 and 155;"

page 27, line 23-page 28, line 6 " A torsional member 250 comprises a support pad 252 pivotally connected to the pinion housing 216 at a pivot 254 and extends laterally away from the pinion housing 216. An "L"-shaped lever 256 is pivotally connected to the rack 214 at a pivot 258 on the end of the short leg of the "L"-shaped lever 256. A slide 259 is formed at the intersection of the short and long legs of the "L"-shaped lever 256. The slide 259 slidably contacts the support pad 252;"
page 28, lines15-20: " The "L"-shaped lever 256 is then rotated downwardly toward the patient's chest such that the slide portion 259 slides along the support pad 252 while the "L"-shaped lever 256 pivots about the pivot 258. As a result, one end of the rack 214 is raised to vertically offset blade 230 relative to 231;"

page 31, line 7-page 32, line 22: "Turning to Figures 14 and 15, a pry bar 370, which is used in conjunction with the access platform 310 to offset a patient's ribs, is shown. The pry bar 370 comprises an "S"-shaped body 372 pivotally connected to a pivot base 377 at pivot 378. The pivot base 377 is in turn pivotally connected to a blade arm 382 at pivot 380. The blade arm 382 extends downwardly from the pivot 380 and connects to a blade 384. The blade 384 includes an elongated vane 386 and a deep recessed throat 388. A sternal pad 374 is connected to a post 379 that slidably connects to the lower portion 373 of the "S"-shaped body 372 via a slide 376.

In operation, the blade 384 is positioned such that the throat 388 captures the blade 350 or 352 of the access platform 310. As the throat 388 captures the blade 350 or 352 the elongated vane 386 extends under a plurality of the patient's ribs to be offset. The pivot base 377 and the pivots 378 and 380 enable the pry bar 370 to be adjustably positioned about two different axes of rotation.

Once the blade 384 is positioned, the sternal pad 374 is adjustably located to atraumatically conform the pry bar 370 to the anatomy of the patient. Once the sternal pad 374 is in position, a handle 375, in the upper portion of the "S"-shaped body 372, is pulled to pivot the pry bar 370 about the sternal pad 374 and lift the blade 384 and the blade 350 or 352 of the access platform 310 to offset the patient's ribs and create a "tunnel" to increase the surgeon's working space and visual access for the dissection of the IMA.

Alternatively, a fifth embodiment of the access platform 310 is shown in Figure 16 to comprise a combination of components from the first and fourth embodiments. More particularly, the torsional members 30 and 31 of the first embodiment are interposed between and operably connected to the fingers 330A and 330B and the housing 322, and interposed between and operably connected to the fingers 332A and 332B and the spreader base 328, respectively. In addition, the support pads 80 and 81 of the first embodiment are adjustably attached to the fingers 330A and 332B. By including the torsional members 30 and 31 and the support pads 80 and 81, a second axis of rotation A_2 is provided. Thus, as in the first embodiment, the torsional members 30 and 31 enable the access platform 310 to vertically displace the blades 350 and 352 and the retracted ribs;"

page 34, lines 1-11: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient;"

	page 38, line 2-page 40, line 15: "The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624. The offset link 632 comprises a substantially "L" shaped base 631 that extends from the pinion housing 620 at one end and terminates at the other end in a pair of parallel spaced and arcuate shaped fingers 633 and 634. A bushing 635 having a hole tapped through its center perpendicular to the bushing's 635 longitudinal axis, is rotatably captured by the fingers 633 and 634. An adjustable offset drive screw 636 is threaded through the hole in the bushing 635 and is operably connected to the shoe arm 682. The adjustable offset drive screw 636 comprises a handle 637 attached to the top of a jack screw 638. The base of the jack screw 638 is formed as a full radius sphere 639. The sphere 639 operably couples with a full radius recess 686 cut into a boss 684 that extends outwardly from the shoe arm 682. The boss 684 is tilted upwardly at an angle Θ relative to the longitudinal axis of the shoe arm 682. This construction ensures that the sphere 639 will maintain contact with the boss 684 during operation as the jack screw 637 forces the shoe arm 682 and shoe 680 to rotate downwardly in a clockwise direction;"

90. The retractor according to claim 89 in which said adjustable lifter blade comprises: blade mounting means; an adjustable lifter blade hingedly attached to said blade mounting means;	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
	page 38, lines 2-20: " The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624;"

angle adjusting means for adjusting the angle of retraction of said adjustable lifter blade; whereby said blade lifts an upper portion of the ribcage to provide improved access and visibility of the intermammary artery.	page 38, line 21-page 39, line 15: "The offset link 632 comprises a substantially "L" shaped base 631 that extends from the pinion housing 620 at one end and terminates at the other end in a pair of parallel spaced and arcuate shaped fingers 633 and 634. A bushing 635 having a hole tapped through its center perpendicular to the bushing's 635 longitudinal axis, is rotatably captured by the fingers 633 and 634. An adjustable offset drive screw 636 is threaded through the hole in the bushing 635 and is operably connected to the shoe arm 682. The adjustable offset drive screw 636 comprises a handle 637 attached to the top of a jack screw 638. The base of the jack screw 638 is formed as a full radius sphere 639. The sphere 639 operably couples with a full radius recess 686 cut into a boss 684 that extends outwardly from the shoe arm 682. The boss 684 is tilted upwardly at an angle Θ relative to the longitudinal axis of the shoe arm 682. This construction ensures that the sphere 639 will maintain contact with the boss 684 during operation as the jack screw 637 forces the shoe arm 682 and shoe 680 to rotate downwardly in a clockwise direction;"
92. The retractor according to claim 90 in which said adjustable lifter blade has a curved portion and a tongue portion; said tongue portion being tapered toward a tip.	page 14, line 10-page 15, line 5: "Referring to Figure 2, the blades 50 and 51 preferably include elongated vanes 52 and 53, which slide beneath a plurality of the patient's ribs, and recessed arcuate throats 54 and 55 that receive the patient's ribs that are adjacent to the chest incision. The benefits of the recessed throats 54 and 55 and the elongated vanes 52 and 53 will be discussed below with regard to the operation of the access platform 10. Blade arms 56 and 57 interconnect the blades 50 and 51 to the rest of the access platform 10. The blade arms 56 and 57 comprise arm stems 62 and 63 received in sockets 34 and 35 in torque bases 32 and 33. The sockets 34 and 35 and the stems 62 and 63 are constructed such that the blade arms 56 and 57 are releasably connected to the torque bases 32 and 33. The stems 62 and 63, which extend relatively horizontally from the torque bases 32 and 33, include pivot sections 60 and 61 extending therefrom. Branches 58 and 59 extend outwardly and downwardly away from the pivot sections 60 and 61 and are attached to the throats 54 and 55 of the blades 50 and 51. This blade arm construction advantageously directs the bulk of the access platform 10 away from the surgeon's working area;"
	page 21, lines 5-14: "The elongated vane construction of the blades 50 and 51 advantageously enables the access platform 10 to vertically raise a plurality of the patient's ribs R to cause a greater "tunnel" effect under a patient's rib cage and, thus, increases the surgeon's working area and visual access to the IMA. The recessed throat construction of the blades 50 and 51 advantageously enables the access platform 10 to vertically displace the opposite rib that is adjacent to the chest incision downwardly to further increase the surgeon's visual access. This combined motion helps to create an optimum tunnel;"

	page 37, lines 11-15: " The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs.;"
94. The retractor according to claim 89 in which said retractor tilting means comprises an adjustable support tower attached to a free end of said crossbar on said retractor frame for raising or lowering the retractor frame to raise an upper portion of the ribcage to provide improved access And visibility of said intermammary artery.	page 15, line 6-page 16, line 2: "The support pads 80 and 81 are connected to adjustable arms 86 and 87 by swivel connectors 82 and 83 that are preferably constructed as ball and socket type connectors. The adjustable arms 86 and 87 preferably include external shafts 88 and 89 slidably received over and operably connected to internal shafts 98 and 99. The external shafts 88 and 89 are preferably operably connected to the internal shafts 98 and 99 via a ratchet lever mechanism (not shown). The internal shafts 98 and 99 of the adjustable arms 86 and 87 are further connected to lock positioners 90 and 91. The lock positioners 90 and 91, which are attached to the torque bases 32 and 33, comprise a ratchet or a wrap spring type mechanism (not shown) or, alternatively, comprise opposing face gears 94 and 96, 95 and 97. Tabs 92 and 93 rotate and cooperate with cammed or serrated surfaces 36 and 37 on the outer face of the outer face gears 94 and 95 to engage and disengage the opposing face gears 96 and 97. Thus, when the tabs 92 and 93 are rotated to disengage the face gears 94 and 96, 95 and 97, the support pads 80 and 81 can be rotated to a desired position. Once the support pads 80 and 81 are in position, the tabs 92 and 93 are rotated to engage the face gears 94 and 96, 95 and 97 and, thus, lock the support pads 80 and 81 in place;"
	page 24, lines 3-17: " Preferably, one end of the horizontally disposed rack 120 is connected to a slide 172 of a lock positioner 171. The slide 172 is slidably received over a vertically disposed support pad stanchion 167. The stanchion 167 has ratchet gear teeth 173 formed thereon which cooperate with a ratchet lever 174 attached to the slide 172 to adjustably position the support pad 161. The support pad 161 is adjustably connected to the stanchion 167 by a swivel connector 163. The opposing end of the horizontally disposed rack 120 is preferably connected to a support pad link 176 via a lockable ball and socket joint 177. The support pad link 176 is further connected to a second support pad link 175 via a hinge joint 178. This link and joint assembly allows for the multiple positioning of the support pad 160. The support pad 160 is further connected to the support pad link 175 via a swivel connector 162;"

	page 34, lines 1-19: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient. A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs;"
	page 38, line 8-page 39, line 15: "To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624. The offset link 632 comprises a substantially "L" shaped base 631 that extends from the pinion housing 620 at one end and terminates at the other end in a pair of parallel spaced and arcuate shaped fingers 633 and 634. A bushing 635 having a hole tapped through its center perpendicular to the bushing's 635 longitudinal axis, is rotatably captured by the fingers 633 and 634. An adjustable offset drive screw 636 is threaded through the hole in the bushing 635 and is operably connected to the shoe arm 682. The adjustable offset drive screw 636 comprises a handle 637 attached to the top of a jack screw 638. The base of the jack screw 638 is formed as a full radius sphere 639. The sphere 639 operably couples with a full radius recess 686 cut into a boss 684 that extends outwardly from the shoe arm 682. The boss 684 is tilted upwardly at an angle Θ relative to the longitudinal axis of the shoe arm 682. This construction ensures that the sphere 639 will maintain contact with the boss 684 during operation as the jack screw 637 forces the shoe arm 682 and shoe 680 to rotate downwardly in a clockwise direction;"

95. The retractor according to claim 94 in which said adjustable support tower comprises a support bar mounted on a free end of said retractor crossbar:	
a support shaft;	page 34, lines 1-19: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient. A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs;"
clamp means for clamping and adjustably positioning said support shaft on said support bar to raise or lower said retractor.	page 34, lines 1-19: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient. A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs;"

96. The retractor according to claim 95 including a footpad on an end of said support shaft.	page 15, line 6-page 16, line 2: "The support pads 80 and 81 are connected to adjustable arms 86 and 87 by swivel connectors 82 and 83 that are preferably constructed as ball and socket type connectors. The adjustable arms 86 and 87 preferably include external shafts 88 and 89 slidably received over and operably connected to internal shafts 98 and 99. The external shafts 88 and 89 are preferably operably connected to the internal shafts 98 and 99 via a ratchet lever mechanism (not shown). The internal shafts 98 and 99 of the adjustable arms 86 and 87 are further connected to lock positioners 90 and 91. The lock positioners 90 and 91, which are attached to the torque bases 32 and 33, comprise a ratchet or a wrap spring type mechanism (not shown) or, alternatively, comprise opposing face gears 94 and 96, 95 and 97. Tabs 92 and 93 rotate and cooperate with cammed or serrated surfaces 36 and 37 on the outer face of the outer face gears 94 and 95 to engage and disengage the opposing face gears 96 and 97. Thus, when the tabs 92 and 93 are rotated to disengage the face gears 94 and 96, 95 and 97, the support pads 80 and 81 can be rotated to a desired position. Once the support pads 80 and 81 are in position, the tabs 92 and 93 are rotated to engage the face gears 94 and 96, 95 and 97 and, thus, lock the support pads 80 and 81 in place;"
	page 24, lines 3-17: " Preferably, one end of the horizontally disposed rack 120 is connected to a slide 172 of a lock positioner 171. The slide 172 is slidably received over a vertically disposed support pad stanchion 167. The stanchion 167 has ratchet gear teeth 173 formed thereon which cooperate with a ratchet lever 174 attached to the slide 172 to adjustably position the support pad 161. The support pad 161 is adjustably connected to the stanchion 167 by a swivel connector 163. The opposing end of the horizontally disposed rack 120 is preferably connected to a support pad link 176 via a lockable ball and socket joint 177. The support pad link 176 is further connected to a second support pad link 175 via a hinge joint 178. This link and joint assembly allows for the multiple positioning of the support pad 160. The support pad 160 is further connected to the support pad link 175 via a swivel connector 162;"

	page 38, line 8-page 39, line 15: "To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624. The offset link 632 comprises a substantially "L" shaped base 631 that extends from the pinion housing 620 at one end and terminates at the other end in a pair of parallel spaced and arcuate shaped fingers 633 and 634. A bushing 635 having a hole tapped through its center perpendicular to the bushing's 635 longitudinal axis, is rotatably captured by the fingers 633 and 634. An adjustable offset drive screw 636 is threaded through the hole in the bushing 635 and is operably connected to the shoe arm 682. The adjustable offset drive screw 636 comprises a handle 637 attached to the top of a jack screw 638. The base of the jack screw 638 is formed as a full radius sphere 639. The sphere 639 operably couples with a full radius recess 686 cut into a boss 684 that extends outwardly from the shoe arm 682. The boss 684 is tilted upwardly at an angle Θ relative to the longitudinal axis of the shoe arm 682. This construction ensures that the sphere 639 will maintain contact with the boss 684 during operation as the jack screw 637 forces the shoe arm 682 and shoe 680 to rotate downwardly in a clockwise direction

100. The retractor according to claim 90 including means for pivotally mounting said adjustable lifter blade on said movable retractor arm.	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
	page 38, lines 2-20: " The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624;"

102. The retractor according to claim 89 in which said adjustable lifter blade is self-adjusting.	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
	page 38, lines 2-20: " The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624;"

	page 39, line 23-page 41, line 7: "In operation, the blades 650 and 652 are inserted in an incision in the patient's chest such that the elongated vanes 656 and 657 of the blade 652 that is interconnected to the moveable pivot 625 are positioned under the patient's ribs while the recessed throats 653 and 654 of the blades 650 and 652 are positioned to receive the ribs that are adjacent to the incision. After the blades 650 and 652 are properly positioned, the stem 644 of the blade arm 640 is inserted through the fixed pivot lock 615 into the socket 618 of the fixed pivot 616. Meanwhile, the stem 646 of the blade arm 642 is inserted through the moveable pivot lock 626 and the end of the shoe arm 682 opposite the shoe 680, and into the socket 625 of the moveable pivot 624. The blade 650 that is interconnected to the fixed pivot 616 is then fixed in position by tightening the fixed pivot lock screw 617 to tighten the fixed pivot lock 615 around the stem 644 of the blade arm 640. The rib compression shoe 680 is then adjusted by adjusting the adjustable offset drive screw 636 until the desired compression of the ribs is achieved. The blade 652 that is interconnected to the moveable pivot 624 is then temporarily fixed in position relative to the shoe 680 by tightening the moveable pivot lock screw 627 to tighten the moveable pivot lock 626 around the stem 646 of the blade arm 642. The ribs are then separated and offset by rotating the lever 622 to drive the pinion 621 along the rack 613 until a desired opening width and offset height is realized. Further adjustment of offset height may be obtained by first loosening the moveable pivot lock 626 around the stem 646 of the blade arm 642 and then adjusting the adjustable offset drive screw 636 to cause the shoe 680 and the shoe arm 682 to rotate downwardly in a clockwise direction and, also, cause the blade 652 that is interconnected to the moveable pivot 624 to rotate upwardly in a clockwise direction, until a desired offset is achieved;"

103. The retractor according to claim 102 including mounting means mounting said self-adjusting lifter blade so that said self-adjusting lifter blade swings freely on said movable retractor arm.	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
	page 38, lines 2-20: " The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624;"

	page 39, line 23-page 41, line 7: "In operation, the blades 650 and 652 are inserted in an incision in the patient's chest such that the elongated vanes 656 and 657 of the blade 652 that is interconnected to the moveable pivot 625 are positioned under the patient's ribs while the recessed throats 653 and 654 of the blades 650 and 652 are positioned to receive the ribs that are adjacent to the incision. After the blades 650 and 652 are properly positioned, the stem 644 of the blade arm 640 is inserted through the fixed pivot lock 615 into the socket 618 of the fixed pivot 616. Meanwhile, the stem 646 of the blade arm 642 is inserted through the moveable pivot lock 626 and the end of the shoe arm 682 opposite the shoe 680, and into the socket 625 of the moveable pivot 624. The blade 650 that is interconnected to the fixed pivot 616 is then fixed in position by tightening the fixed pivot lock screw 617 to tighten the fixed pivot lock 615 around the stem 644 of the blade arm 640. The rib compression shoe 680 is then adjusted by adjusting the adjustable offset drive screw 636 until the desired compression of the ribs is achieved. The blade 652 that is interconnected to the moveable pivot 624 is then temporarily fixed in position relative to the shoe 680 by tightening the moveable pivot lock screw 627 to tighten the moveable pivot lock 626 around the stem 646 of the blade arm 642. The ribs are then separated and offset by rotating the lever 622 to drive the pinion 621 along the rack 613 until a desired opening width and offset height is realized. Further adjustment of offset height may be obtained by first loosening the moveable pivot lock 626 around the stem 646 of the blade arm 642 and then adjusting the adjustable offset drive screw 636 to cause the shoe 680 and the shoe arm 682 to rotate downwardly in a clockwise direction and, also, cause the blade 652 that is interconnected to the moveable pivot 624 to rotate upwardly in a clockwise direction, until a desired offset is achieved;"
106. An intermammary artery access retractor comprising:	figures 1-2, 8-16, and 19-22.
	page 1, lines 9-11: "This invention relates to retractors, and more particularly to an access platform that facilitates access to the interior of the chest cavity during surgical procedures;"
	page 8, lines 6-8: "The access platform of the present invention serves to facilitate the dissection of an internal mammary artery (IMA), including both proximal and distal dissection;"
	page 12, lines 2-12: "Referring now in detail to the drawings, therein illustrated are novel embodiments of an access platform that facilitates the dissection of an internal mammary artery (IMA), including both proximal and distal dissection, and access to the heart during a "beating heart" Coronary Artery Bypass Graph (CABG) procedure by increasing the surgeon's working space and visual access. Turning to Figure 1, the access platform 10 incorporating a preferred embodiment of the present invention, is shown disposed over the outline of a patient's chest P. An incision in the patient's chest P adjacent to the LIMA (shown in phantom) exposes an LAD artery on the exterior of the patient's heart."

a spreader member having a first blade arm and a second blade arm, said second blade arm being movable toward or away from said first blade arm;	page 8, line 11-page 9, line 1: " The access platform of the present invention is preferably capable of laterally spreading the ribs, vertically displacing the opposingly retracted ribs relative to each other and depressing the sternum to cause a "tunnel" effect under the retracted ribs. Moreover, it is preferably self-contained such that the force necessary to spread and vertically displace the ribs is applied by the access platform itself rather than through additional external devices. The access platform preferably comprises first and second blades interconnected to a spreader member that laterally drives the blades apart or together, support pads interconnected to the blades, and a bi-directional torsional member interconnected to a blade and the spreader member. The torsional member causes the interconnected blade to be vertically displaced in either direction and, thus, increases the surgeon's working space and visual access to the IMA.;"
	page 12, line 12-page 13, line 7: "Preferably, the access platform 10 comprises a pair of blades 50 and 51, a pair of support pads 80 and 81, a pair of tissue retractors 70 and 71, a pair of torsional members 30 and 31, and a spreader member 12. The torsional members 30 and 31 and the spreader member 12 preferably extend away from the blades 50 and 51 and the tissue retractors 70 and 71 and, thus, the chest incision, in a plane relatively parallel to the patient's chest. As a result, the access platform 10 advantageously maintains a low profile that remains substantially clear of the surgeon's working space. Referring to Figure 2, the components of the access platform 10 are shown less the tissue retractors 70 and 71. The spreader member 12 preferably comprises a rotatable hub 14 including operably coupled upper and lower hub halves 17 and 16. A pair of spreader arms 19 and 18 extend from the upper and lower hubs 17 and 16, respectively, and connect to the torsional members 31 and 30, respectively. Preferably, the hub 14 includes a harmonic gear drive 20 used to rotate the upper hub half 17 relative to the lower hub half 16 and, thus, spread or close the spreader arms 18 and 19 to retract or relax the patient's ribs;"
	page 14, line 17-page 15, line 5: "Blade arms 56 and 57 interconnect the blades 50 and 51 to the rest of the access platform 10. The blade arms 56 and 57 comprise arm stems 62 and 63 received in sockets 34 and 35 in torque bases 32 and 33. The sockets 34 and 35 and the stems 62 and 63 are constructed such that the blade arms 56 and 57 are releasably connected to the torque bases 32 and 33. The stems 62 and 63, which extend relatively horizontally from the torque bases 32 and 33, include pivot sections 60 and 61 extending therefrom. Branches 58 and 59 extend outwardly and downwardly away from the pivot sections 60 and 61 and are attached to the throats 54 and 55 of the blades 50 and 51. This blade arm construction advantageously directs the bulk of the access platform 10 away from the surgeon's working area;"

page 23, lines 2-8: " A second embodiment of the access platform 110 is shown in Figures 8, 9 and 10. The second embodiment of the access platform 110 includes a spreader member 112 preferably comprising a horizontally disposed rack 120 and pinion housings 121 and 122 slidably disposed over the rack 120. The pinion housings 121 and 122 rotatably retain pinions 123 and 124 driven by levers 125 and 126;"

page 23, lines 18-24: " The blade arms 146 and 147 further comprise pivot sections 150 and 151 extending horizontally from the stems 152 and 153. Branches 148 and 149 extend downwardly and outwardly from the pivot sections 150 and 151 of the blade arms 146 and 147 to position the remainder of the access platform 110 away from the surgeon's working area. Branches 148 and 149 attach to blades 140 and 141;"

page 27, lines 9-22: " A third embodiment of the access platform 210 is shown in Figures 11 and 12. The third embodiment of the access platform 210 includes a spreader member 212 comprising a horizontally-disposed rack 214 and pinion housings 216 and 218 slidably disposed over the rack 214. Pinions 220 and 222 are rotatably retained in the pinion housings 216 and 218 and driven by levers 224 and 226.

Blades 230 and 231 comprise elongated vane sections 232 and 233 extending from recessed throat sections 234 and 235. Blade arms 236 and 237 have branches 238 and 239 which extend downwardly and outwardly from horizontally disposed stems 240 and 241 and connect to the blades 230 and 231. The stems 240 and 241 of the blade arms 236 and 237 are releasably received in sockets 217 and 219 in the pinion housings 216 and 218;"

page 29, lines 1-page 30, line 2: "A fourth embodiment is shown in Figures 13A-15. The access platform 310 of the fourth embodiment includes a spreader member 312 comprising a rack 320, a housing 322 slidably received over the rack 320, a pinion 324 rotatably retained in the housing 322 and a lever 326 connected to the pinion 324. A spreader base 328 is attached to one end of the rack 320. A pair of parallel spaced fingers 330A and 330B that extend from the housing 322. Similarly, a pair of parallel spaced fingers 332A and 332B extend from the spreader base 328 and are positioned parallel to the fingers 330A and 330B extending from the housing 322.

A pair of blade arms 338 and 340 include branch sections 346 and 348 that extend downwardly from central portions 339 and 341 and connect to blades 350 and 352. Stem portions 342 and 344 extend from the central portions 339 and 341 opposite the branch sections 346 and 348. The stem 342 extends between and is pivotally mounted to fingers 330A and 330B at a pivot 331. Likewise, stem 344 extends between and is pivotally mounted to fingers 332A and 332B at a pivot 333. As a result, the blade arms 338 and 340 rotate about an axis of rotation A_1 that is parallel to the rack 320. This construction advantageously enables the access platform 310 to address a thoracotomy positioned anywhere along the chest wall without intruding on the surgeon's working space. If the thoracotomy is located on the lateral side of the chest wall the spreader member 312, the spreader base 328 and the housing 322 are simply pivoted out of the surgeon's way;"

page 30, lines 6-24: "Alternatively, as shown in Figure 13B, the access platform 310 of the fourth embodiment includes a pair of links 360 and 362 interposed and hingedly interconnected to the blade arms 338 and 340, respectively, and the housing 322 and spreader base 328, respectively. The links 360 and 362 comprise link bodies 364 and 366, respectively, and parallel spaced fingers 368A and 368B and 369A and 369B, respectively, extending from the link bodies 364 and 366. The link bodies 364 and 366 extend between and pivotally mount to the fingers 330A and 330B and 332A and 332B at pivots 331 and 333, respectively. Likewise, the stems 342 and 344 of the blade arms 338 and 340 extend between and pivotally mount to the fingers 368A and 368B and 369A and 369B at pivots 363 and 365. As a result, the blade arms 338 and 340 and the links 360 and 362 rotate about parallel axes of rotation A_1 and A_2 that are parallel to the rack 320. This construction further enables the access platform 310 to address a thoracotomy positioned anywhere along the chest wall without intruding on the surgeon's working space by easily pivoting the spreader base 328, the housing 332 and the rack 320 out of the surgeon's way;"

page 32, lines 9-22: "Alternatively, a fifth embodiment of the access platform 310 is shown in Figure 16 to comprise a combination of components from the first and fourth embodiments. More particularly, the torsional members 30 and 31 of the first embodiment are interposed between and operably connected to the fingers 330A and 330B and the housing 322, and interposed between and operably connected to the fingers 332A and 332B and the spreader base 328, respectively. In addition, the support pads 80 and 81 of the first embodiment are adjustably attached to the fingers 330A and 332B. By including the torsional members 30 and 31 and the support pads 80 and 81, a second axis of rotation A_2 is provided. Thus, as in the first embodiment, the torsional members 30 and 31 enable the access platform 310 to vertically displace the blades 350 and 352 and the retracted ribs;"

page 34, line 1-page 35, line 2: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient.

A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs.

Torsional members 460 and 462 are attached to the top of the stachion racks 430 and 432. Blade arms 474 and 476 extend outwardly from torsional members and attach to blades 470 and 472. The torsional members comprise inner hubs 461 and 465 rotatably received in and operably connected to outer hubs 463 and 467. Locking levers 464 and 466 lock the outer hubs 463 and 467 in place relative to the inner hubs 461 and 465;"

	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
	page 38, lines 2-20: " The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624;"

a first blade mounted on said first blade arm;	page 8, line 11-page 9, line 1: " The access platform of the present invention is preferably capable of laterally spreading the ribs, vertically displacing the opposingly retracted ribs relative to each other and depressing the sternum to cause a "tunnel" effect under the retracted ribs. Moreover, it is preferably self-contained such that the force necessary to spread and vertically displace the ribs is applied by the access platform itself rather than through additional external devices. The access platform preferably comprises first and second blades interconnected to a spreader member that laterally drives the blades apart or together, support pads interconnected to the blades, and a bi-directional torsional member interconnected to a blade and the spreader member. The torsional member causes the interconnected blade to be vertically displaced in either direction and, thus, increases the surgeon's working space and visual access to the IMA.;"
	page 12, lines 12-15: "Preferably, the access platform 10 comprises a pair of blades 50 and 51, a pair of support pads 80 and 81, a pair of tissue retractors 70 and 71, a pair of torsional members 30 and 31, and a spreader member 12.;"
	page 14, line 10-page 15, line 5: "Referring to Figure 2, the blades 50 and 51 preferably include elongated vanes 52 and 53, which slide beneath a plurality of the patient's ribs, and recessed arcuate throats 54 and 55 that receive the patient's ribs that are adjacent to the chest incision. The benefits of the recessed throats 54 and 55 and the elongated vanes 52 and 53 will be discussed below with regard to the operation of the access platform 10. Blade arms 56 and 57 interconnect the blades 50 and 51 to the rest of the access platform 10. The blade arms 56 and 57 comprise arm stems 62 and 63 received in sockets 34 and 35 in torque bases 32 and 33. The sockets 34 and 35 and the stems 62 and 63 are constructed such that the blade arms 56 and 57 are releasably connected to the torque bases 32 and 33. The stems 62 and 63, which extend relatively horizontally from the torque bases 32 and 33, include pivot sections 60 and 61 extending therefrom. Branches 58 and 59 extend outwardly and downwardly away from the pivot sections 60 and 61 and are attached to the throats 54 and 55 of the blades 50 and 51. This blade arm construction advantageously directs the bulk of the access platform 10 away from the surgeon's working area;"
	page 23, line 18-page 24, line 2: "The blade arms 146 and 147 further comprise pivot sections 150 and 151 extending horizontally from the stems 152 and 153. Branches 148 and 149 extend downwardly and outwardly from the pivot sections 150 and 151 of the blade arms 146 and 147 to position the remainder of the access platform 110 away from the surgeon's working area. Branches 148 and 149 attach to blades 140 and 141. The blades 140 and 141 comprise elongated vane sections 142 and 143 extending outwardly from recessed throat sections 144 and 145;"

page 27, lines 16-22: " Blades 230 and 231 comprise elongated vane sections 232 and 233 extending from recessed throat sections 234 and 235. Blade arms 236 and 237 have branches 238 and 239 which extend downwardly and outwardly from horizontally disposed stems 240 and 241 and connect to the blades 230 and 231. The stems 240 and 241 of the blade arms 236 and 237 are releasably received in sockets 217 and 219 in the pinion housings 216 and 218;"

page 29, lines 11-13: "A pair of blade arms 338 and 340 include branch sections 346 and 348 that extend downwardly from central portions 339 and 341 and connect to blades 350 and 352;"

page 32, lines 9-22: "Alternatively, a fifth embodiment of the access platform 310 is shown in Figure 16 to comprise a combination of components from the first and fourth embodiments. More particularly, the torsional members 30 and 31 of the first embodiment are interposed between and operably connected to the fingers 330A and 330B and the housing 322, and interposed between and operably connected to the fingers 332A and 332B and the spreader base 328, respectively. In addition, the support pads 80 and 81 of the first embodiment are adjustably attached to the fingers 330A and 332B. By including the torsional members 30 and 31 and the support pads 80 and 81, a second axis of rotation A_2 is provided. Thus, as in the first embodiment, the torsional members 30 and 31 enable the access platform 310 to vertically displace the blades 350 and 352 and the retracted ribs;"

page 34, line 1-page 35, line 2: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient.

A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs.

Torsional members 460 and 462 are attached to the top of the stachion racks 430 and 432. Blade arms 474 and 476 extend outwardly from torsional members and attach to blades 470 and 472. The torsional members comprise inner hubs 461 and 465 rotatably received in and operably connected to outer hubs 463 and 467. Locking levers 464 and 466 lock the outer hubs 463 and 467 in place relative to the inner hubs 461 and 465;"

	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
a second blade mounted on said second blade arm;	page 8, line 11-page 9, line 1: " The access platform of the present invention is preferably capable of laterally spreading the ribs, vertically displacing the opposingly retracted ribs relative to each other and depressing the sternum to cause a "tunnel" effect under the retracted ribs. Moreover, it is preferably self-contained such that the force necessary to spread and vertically displace the ribs is applied by the access platform itself rather than through additional external devices. The access platform preferably comprises first and second blades interconnected to a spreader member that laterally drives the blades apart or together, support pads interconnected to the blades, and a bi-directional torsional member interconnected to a blade and the spreader member. The torsional member causes the interconnected blade to be vertically displaced in either direction and, thus, increases the surgeon's working space and visual access to the IMA.;"
	page 12, lines 12-15: "Preferably, the access platform 10 comprises a pair of blades 50 and 51, a pair of support pads 80 and 81, a pair of tissue retractors 70 and 71, a pair of torsional members 30 and 31, and a spreader member 12.;"

page 14, line 10-page 15, line 5: "Referring to Figure 2, the blades 50 and 51 preferably include elongated vanes 52 and 53, which slide beneath a plurality of the patient's ribs, and recessed arcuate throats 54 and 55 that receive the patient's ribs that are adjacent to the chest incision. The benefits of the recessed throats 54 and 55 and the elongated vanes 52 and 53 will be discussed below with regard to the operation of the access platform 10. Blade arms 56 and 57 interconnect the blades 50 and 51 to the rest of the access platform 10. The blade arms 56 and 57 comprise arm stems 62 and 63 received in sockets 34 and 35 in torque bases 32 and 33. The sockets 34 and 35 and the stems 62 and 63 are constructed such that the blade arms 56 and 57 are releasably connected to the torque bases 32 and 33. The stems 62 and 63, which extend relatively horizontally from the torque bases 32 and 33, include pivot sections 60 and 61 extending therefrom. Branches 58 and 59 extend outwardly and downwardly away from the pivot sections 60 and 61 and are attached to the throats 54 and 55 of the blades 50 and 51. This blade arm construction advantageously directs the bulk of the access platform 10 away from the surgeon's working area;"
page 23, line 18-page 24, line 2: "The blade arms 146 and 147 further comprise pivot sections 150 and 151 extending horizontally from the stems 152 and 153. Branches 148 and 149 extend downwardly and outwardly from the pivot sections 150 and 151 of the blade arms 146 and 147 to position the remainder of the access platform 110 away from the surgeon's working area. Branches 148 and 149 attach to blades 140 and 141. The blades 140 and 141 comprise elongated vane sections 142 and 143 extending outwardly from recessed throat sections 144 and 145;"
page 27, lines 16-22: " Blades 230 and 231 comprise elongated vane sections 232 and 233 extending from recessed throat sections 234 and 235. Blade arms 236 and 237 have branches 238 and 239 which extend downwardly and outwardly from horizontally disposed stems 240 and 241 and connect to the blades 230 and 231. The stems 240 and 241 of the blade arms 236 and 237 are releasably received in sockets 217 and 219 in the pinion housings 216 and 218;"
page 29, lines 11-13: "A pair of blade arms 338 and 340 include branch sections 346 and 348 that extend downwardly from central portions 339 and 341 and connect to blades 350 and 352;"

page 32, lines 9-22: "Alternatively, a fifth embodiment of the access platform 310 is shown in Figure 16 to comprise a combination of components from the first and fourth embodiments. More particularly, the torsional members 30 and 31 of the first embodiment are interposed between and operably connected to the fingers 330A and 330B and the housing 322, and interposed between and operably connected to the fingers 332A and 332B and the spreader base 328, respectively. In addition, the support pads 80 and 81 of the first embodiment are adjustably attached to the fingers 330A and 332B. By including the torsional members 30 and 31 and the support pads 80 and 81, a second axis of rotation A_2 is provided. Thus, as in the first embodiment, the torsional members 30 and 31 enable the access platform 310 to vertically displace the blades 350 and 352 and the retracted ribs;"

page 34, line 1-page 35, line 2: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient.

A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs.

Torsional members 460 and 462 are attached to the top of the stachion racks 430 and 432. Blade arms 474 and 476 extend outwardly from torsional members and attach to blades 470 and 472. The torsional members comprise inner hubs 461 and 465 rotatably received in and operably connected to outer hubs 463 and 467. Locking levers 464 and 466 lock the outer hubs 463 and 467 in place relative to the inner hubs 461 and 465;"

	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
an offset member adapted to lift said second blade relative to said first blade to lift a portion of a ribcage to provide improved access to the intermammary artery.	page 8, line 11-page 9, line 1: "The access platform of the present invention is preferably capable of laterally spreading the ribs, vertically displacing the opposingly retracted ribs relative to each other and depressing the sternum to cause a "tunnel" effect under the retracted ribs. Moreover, it is preferably self-contained such that the force necessary to spread and vertically displace the ribs is applied by the access platform itself rather than through additional external devices. The access platform preferably comprises first and second blades interconnected to a spreader member that laterally drives the blades apart or together, support pads interconnected to the blades, and a bi-directional torsional member interconnected to a blade and the spreader member. The torsional member causes the interconnected blade to be vertically displaced in either direction and, thus, increases the surgeon's working space and visual access to the IMA.;"

page 12, lines 12-page 13, line 7: "Preferably, the access platform 10 comprises a pair of blades 50 and 51, a pair of support pads 80 and 81, a pair of tissue retractors 70 and 71, a pair of torsional members 30 and 31, and a spreader member 12. The torsional members 30 and 31 and the spreader member 12 preferably extend away from the blades 50 and 51 and the tissue retractors 70 and 71 and, thus, the chest incision, in a plane relatively parallel to the patient's chest. As a result, the access platform 10 advantageously maintains a low profile that remains substantially clear of the surgeon's working space.

Referring to Figure 2, the components of the access platform 10 are shown less the tissue retractors 70 and 71. The spreader member 12 preferably comprises a rotatable hub 14 including operably coupled upper and lower hub halves 17 and 16. A pair of spreader arms 19 and 18 extend from the upper and lower hubs 17 and 16, respectively, and connect to the torsional members 31 and 30, respectively. Preferably, the hub 14 includes a harmonic gear drive 20 used to rotate the upper hub half 17 relative to the lower hub half 16 and, thus, spread or close the spreader arms 18 and 19 to retract or relax the patient's ribs;"

page 16, lines 3-20: " The torsional members 30 and 31 are operably connected to the torque bases 32 and 33 and the spreader arms 18 and 19 to enable the access platform 10 to both laterally retract and vertically displace a patient's ribs R. Thus, the torsional members 30 and 31 enable the access platform 10 to be advantageously self-contained such that the force necessary to spread and vertically displace a patient's ribs, and the force necessary to depress the patient's sternum, is applied by the access platform 10 itself rather than through additional external devices.

The torsional members 30 and 31 preferably comprise a reduction gear assembly 40 (see Figure 4). The reduction gear assembly 40 comprises a drive nut 42 rotatably captured on the end of the shaft of the spreader arm 18 or 19, a first shaft 45 axially extending from the spreader arm 18 or 19, and a second shaft 47 extending from the torque base 32 or 33. the second shaft 47 is rotatably captured over the first shaft 45 by a shoulder screw 49;"

page 26, lines 6-17: "The pinion housings 121 and 122 rotatably retain pinions 123 and 124 driven by levers 125 and 126.

Torsional members 130 and 131 preferably comprise curved racks 132 and 133 slidably received within pinion housings 134 and 135. The pinion housings 134 and 135 are fixedly attached to the pinion housings 122 and 121. The pinion housings 134 and 135 rotatably retain pinions 136 and 137 driven by levers 138 and 139. Sockets 154 and 155 are formed in the lower ends of the curved racks 132 and 133. Stems 152 and 153 of blade arms 146 and 147 are releasably received by and horizontally extend from the sockets 154 and 155;"

page 27, line 23-page 28, line 6 " A torsional member 250 comprises a support pad 252 pivotally connected to the pinion housing 216 at a pivot 254 and extends laterally away from the pinion housing 216. An "L"-shaped lever 256 is pivotally connected to the rack 214 at a pivot 258 on the end of the short leg of the "L"-shaped lever 256. A slide 259 is formed at the intersection of the short and long legs of the "L"-shaped lever 256. The slide 259 slidably contacts the support pad 252;"
page 28, lines15-20: " The "L"-shaped lever 256 is then rotated downwardly toward the patient's chest such that the slide portion 259 slides along the support pad 252 while the "L"-shaped lever 256 pivots about the pivot 258. As a result, one end of the rack 214 is raised to vertically offset blade 230 relative to 231;"

page 31, line 7-page 32, line 22: "Turning to Figures 14 and 15, a pry bar 370, which is used in conjunction with the access platform 310 to offset a patient's ribs, is shown. The pry bar 370 comprises an "S"-shaped body 372 pivotally connected to a pivot base 377 at pivot 378. The pivot base 377 is in turn pivotally connected to a blade arm 382 at pivot 380. The blade arm 382 extends downwardly from the pivot 380 and connects to a blade 384. The blade 384 includes an elongated vane 386 and a deep recessed throat 388. A sternal pad 374 is connected to a post 379 that slidably connects to the lower portion 373 of the "S"-shaped body 372 via a slide 376.

In operation, the blade 384 is positioned such that the throat 388 captures the blade 350 or 352 of the access platform 310. As the throat 388 captures the blade 350 or 352 the elongated vane 386 extends under a plurality of the patient's ribs to be offset. The pivot base 377 and the pivots 378 and 380 enable the pry bar 370 to be adjustably positioned about two different axes of rotation.

Once the blade 384 is positioned, the sternal pad 374 is adjustably located to atraumatically conform the pry bar 370 to the anatomy of the patient. Once the sternal pad 374 is in position, a handle 375, in the upper portion of the "S"-shaped body 372, is pulled to pivot the pry bar 370 about the sternal pad 374 and lift the blade 384 and the blade 350 or 352 of the access platform 310 to offset the patient's ribs and create a "tunnel" to increase the surgeon's working space and visual access for the dissection of the IMA.

Alternatively, a fifth embodiment of the access platform 310 is shown in Figure 16 to comprise a combination of components from the first and fourth embodiments. More particularly, the torsional members 30 and 31 of the first embodiment are interposed between and operably connected to the fingers 330A and 330B and the housing 322, and interposed between and operably connected to the fingers 332A and 332B and the spreader base 328, respectively. In addition, the support pads 80 and 81 of the first embodiment are adjustably attached to the fingers 330A and 332B. By including the torsional members 30 and 31 and the support pads 80 and 81, a second axis of rotation A_2 is provided. Thus, as in the first embodiment, the torsional members 30 and 31 enable the access platform 310 to vertically displace the blades 350 and 352 and the retracted ribs;"

page 34, lines 1-11: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient;"

	page 38, line 2-page 40, line 15: "The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624. The offset link 632 comprises a substantially "L" shaped base 631 that extends from the pinion housing 620 at one end and terminates at the other end in a pair of parallel spaced and arcuate shaped fingers 633 and 634. A bushing 635 having a hole tapped through its center perpendicular to the bushing's 635 longitudinal axis, is rotatably captured by the fingers 633 and 634. An adjustable offset drive screw 636 is threaded through the hole in the bushing 635 and is operably connected to the shoe arm 682. The adjustable offset drive screw 636 comprises a handle 637 attached to the top of a jack screw 638. The base of the jack screw 638 is formed as a full radius sphere 639. The sphere 639 operably couples with a full radius recess 686 cut into a boss 684 that extends outwardly from the shoe arm 682. The boss 684 is tilted upwardly at an angle Θ relative to the longitudinal axis of the shoe arm 682. This construction ensures that the sphere 639 will maintain contact with the boss 684 during operation as the jack screw 637 forces the shoe arm 682 and shoe 680 to rotate downwardly in a clockwise direction;"

107. The retractor according to claim 106 in which said second blade is pivotally attached to said spreader member, and	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
	page 38, lines 2-20: " The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624;"

an angle adjusting means for adjusting the angle of retraction of said second blade; whereby said blade lifts an upper portion of the ribcage to provide improved access and visibility of the intermammary artery.	page 38, line 21-page 39, line 15: "The offset link 632 comprises a substantially "L" shaped base 631 that extends from the pinion housing 620 at one end and terminates at the other end in a pair of parallel spaced and arcuate shaped fingers 633 and 634. A bushing 635 having a hole tapped through its center perpendicular to the bushing's 635 longitudinal axis, is rotatably captured by the fingers 633 and 634. An adjustable offset drive screw 636 is threaded through the hole in the bushing 635 and is operably connected to the shoe arm 682. The adjustable offset drive screw 636 comprises a handle 637 attached to the top of a jack screw 638. The base of the jack screw 638 is formed as a full radius sphere 639. The sphere 639 operably couples with a full radius recess 686 cut into a boss 684 that extends outwardly from the shoe arm 682. The boss 684 is tilted upwardly at an angle Θ relative to the longitudinal axis of the shoe arm 682. This construction ensures that the sphere 639 will maintain contact with the boss 684 during operation as the jack screw 637 forces the shoe arm 682 and shoe 680 to rotate downwardly in a clockwise direction;"
108. The retractor according to claim 106 in which said second blade has a curved throat portion and a elongated vane portion; said vane portion being tapered toward a tip.	page 14, line 10-page 15, line 5: "Referring to Figure 2, the blades 50 and 51 preferably include elongated vanes 52 and 53, which slide beneath a plurality of the patient's ribs, and recessed arcuate throats 54 and 55 that receive the patient's ribs that are adjacent to the chest incision. The benefits of the recessed throats 54 and 55 and the elongated vanes 52 and 53 will be discussed below with regard to the operation of the access platform 10. Blade arms 56 and 57 interconnect the blades 50 and 51 to the rest of the access platform 10. The blade arms 56 and 57 comprise arm stems 62 and 63 received in sockets 34 and 35 in torque bases 32 and 33. The sockets 34 and 35 and the stems 62 and 63 are constructed such that the blade arms 56 and 57 are releasably connected to the torque bases 32 and 33. The stems 62 and 63, which extend relatively horizontally from the torque bases 32 and 33, include pivot sections 60 and 61 extending therefrom. Branches 58 and 59 extend outwardly and downwardly away from the pivot sections 60 and 61 and are attached to the throats 54 and 55 of the blades 50 and 51. This blade arm construction advantageously directs the bulk of the access platform 10 away from the surgeon's working area;"
	page 21, lines 5-14: "The elongated vane construction of the blades 50 and 51 advantageously enables the access platform 10 to vertically raise a plurality of the patient's ribs R to cause a greater "tunnel" effect under a patient's rib cage and, thus, increases the surgeon's working area and visual access to the IMA. The recessed throat construction of the blades 50 and 51 advantageously enables the access platform 10 to vertically displace the opposite rib that is adjacent to the chest incision downwardly to further increase the surgeon's visual access. This combined motion helps to create an optimum tunnel;"

	page 37, lines 11-15: " The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs.;"
109. The retractor according to claim 106 in which said offset member comprises an adjustable support arm attached to said spreader member for raising or lowering said second blade relative to said first blade to raise an upper portion of the ribcage to provide improved access and visibility of said intermammary artery.	page 15, line 6-page 16, line 2: "The support pads 80 and 81 are connected to adjustable arms 86 and 87 by swivel connectors 82 and 83 that are preferably constructed as ball and socket type connectors. The adjustable arms 86 and 87 preferably include external shafts 88 and 89 slidably received over and operably connected to internal shafts 98 and 99. The external shafts 88 and 89 are preferably operably connected to the internal shafts 98 and 99 via a ratchet lever mechanism (not shown). The internal shafts 98 and 99 of the adjustable arms 86 and 87 are further connected to lock positioners 90 and 91. The lock positioners 90 and 91, which are attached to the torque bases 32 and 33, comprise a ratchet or a wrap spring type mechanism (not shown) or, alternatively, comprise opposing face gears 94 and 96, 95 and 97. Tabs 92 and 93 rotate and cooperate with cammed or serrated surfaces 36 and 37 on the outer face of the outer face gears 94 and 95 to engage and disengage the opposing face gears 96 and 97. Thus, when the tabs 92 and 93 are rotated to disengage the face gears 94 and 96, 95 and 97, the support pads 80 and 81 can be rotated to a desired position. Once the support pads 80 and 81 are in position, the tabs 92 and 93 are rotated to engage the face gears 94 and 96, 95 and 97 and, thus, lock the support pads 80 and 81 in place;"
	page 24, lines 3-17: " Preferably, one end of the horizontally disposed rack 120 is connected to a slide 172 of a lock positioner 171. The slide 172 is slidably received over a vertically disposed support pad stanchion 167. The stanchion 167 has ratchet gear teeth 173 formed thereon which cooperate with a ratchet lever 174 attached to the slide 172 to adjustably position the support pad 161. The support pad 161 is adjustably connected to the stanchion 167 by a swivel connector 163. The opposing end of the horizontally disposed rack 120 is preferably connected to a support pad link 176 via a lockable ball and socket joint 177. The support pad link 176 is further connected to a second support pad link 175 via a hinge joint 178. This link and joint assembly allows for the multiple positioning of the support pad 160. The support pad 160 is further connected to the support pad link 175 via a swivel connector 162;"

	page 34, lines 1-19: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient. A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs;"
	page 38, line 8-page 39, line 15: "To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624. The offset link 632 comprises a substantially "L" shaped base 631 that extends from the pinion housing 620 at one end and terminates at the other end in a pair of parallel spaced and arcuate shaped fingers 633 and 634. A bushing 635 having a hole tapped through its center perpendicular to the bushing's 635 longitudinal axis, is rotatably captured by the fingers 633 and 634. An adjustable offset drive screw 636 is threaded through the hole in the bushing 635 and is operably connected to the shoe arm 682. The adjustable offset drive screw 636 comprises a handle 637 attached to the top of a jack screw 638. The base of the jack screw 638 is formed as a full radius sphere 639. The sphere 639 operably couples with a full radius recess 686 cut into a boss 684 that extends outwardly from the shoe arm 682. The boss 684 is tilted upwardly at an angle Θ relative to the longitudinal axis of the shoe arm 682. This construction ensures that the sphere 639 will maintain contact with the boss 684 during operation as the jack screw 637 forces the shoe arm 682 and shoe 680 to rotate downwardly in a clockwise direction;"

110. The retractor according to claim 109 including a footpad on an end of said support arm.	page 15, line 6-page 16, line 2: "The support pads 80 and 81 are connected to adjustable arms 86 and 87 by swivel connectors 82 and 83 that are preferably constructed as ball and socket type connectors. The adjustable arms 86 and 87 preferably include external shafts 88 and 89 slidably received over and operably connected to internal shafts 98 and 99. The external shafts 88 and 89 are preferably operably connected to the internal shafts 98 and 99 via a ratchet lever mechanism (not shown). The internal shafts 98 and 99 of the adjustable arms 86 and 87 are further connected to lock positioners 90 and 91. The lock positioners 90 and 91, which are attached to the torque bases 32 and 33, comprise a ratchet or a wrap spring type mechanism (not shown) or, alternatively, comprise opposing face gears 94 and 96, 95 and 97. Tabs 92 and 93 rotate and cooperate with cammed or serrated surfaces 36 and 37 on the outer face of the outer face gears 94 and 95 to engage and disengage the opposing face gears 96 and 97. Thus, when the tabs 92 and 93 are rotated to disengage the face gears 94 and 96, 95 and 97, the support pads 80 and 81 can be rotated to a desired position. Once the support pads 80 and 81 are in position, the tabs 92 and 93 are rotated to engage the face gears 94 and 96, 95 and 97 and, thus, lock the support pads 80 and 81 in place;"
	page 24, lines 3-17: " Preferably, one end of the horizontally disposed rack 120 is connected to a slide 172 of a lock positioner 171. The slide 172 is slidably received over a vertically disposed support pad stanchion 167. The stanchion 167 has ratchet gear teeth 173 formed thereon which cooperate with a ratchet lever 174 attached to the slide 172 to adjustably position the support pad 161. The support pad 161 is adjustably connected to the stanchion 167 by a swivel connector 163. The opposing end of the horizontally disposed rack 120 is preferably connected to a support pad link 176 via a lockable ball and socket joint 177. The support pad link 176 is further connected to a second support pad link 175 via a hinge joint 178. This link and joint assembly allows for the multiple positioning of the support pad 160. The support pad 160 is further connected to the support pad link 175 via a swivel connector 162;"

	page 38, line 8-page 39, line 15: "To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624. The offset link 632 comprises a substantially "L" shaped base 631 that extends from the pinion housing 620 at one end and terminates at the other end in a pair of parallel spaced and arcuate shaped fingers 633 and 634. A bushing 635 having a hole tapped through its center perpendicular to the bushing's 635 longitudinal axis, is rotatably captured by the fingers 633 and 634. An adjustable offset drive screw 636 is threaded through the hole in the bushing 635 and is operably connected to the shoe arm 682. The adjustable offset drive screw 636 comprises a handle 637 attached to the top of a jack screw 638. The base of the jack screw 638 is formed as a full radius sphere 639. The sphere 639 operably couples with a full radius recess 686 cut into a boss 684 that extends outwardly from the shoe arm 682. The boss 684 is tilted upwardly at an angle Θ relative to the longitudinal axis of the shoe arm 682. This construction ensures that the sphere 639 will maintain contact with the boss 684 during operation as the jack screw 637 forces the shoe arm 682 and shoe 680 to rotate downwardly in a clockwise direction

111. The retractor according to claim 109 in which said adjustable support arm comprises	
a stanchion; and	page 34, lines 1-19: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient. A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs;"
slide member for clamping and adjustably positioning said stanchion on a table or bar and to raise or lower said stanchion to vertically adjust said second blade relative to said first blade.	page 34, lines 1-19: "Turning to Figure 19, a seventh embodiment of the access platform 410 of the present invention is shown. The access platform 410 mounts to the table or rail via slides 438 and 440 that locked in place by positioners 450 and 452. The slides 438 and 440 rotatably retains pinions 442 and 444 driven by levers 446 and 448 and slidably received stachion racks 430 and 432. The stachion racks 430 and 432 include rack gears 434 and 436 that operably couple with pinions 442 and 444. The levers 446 and 448 are rotated to drive the pinions 442 and 444 along rack gears 434 and 436 to adjust the height of the stachion racks 430 and 432 relative to the table or patient. A pinion housing 422 is attached to the stachion rack 432 towards its upper end. A rack 420 is attached at one end to stachion rack 430 and is slidably received in the pinion housing 422. A pinion 424 driven by a lever 426 is rotatably retained in the pinion housing 422 and operably connected to the rack 420. The lever 426 is rotated to drive the pinion 424 along the rack 420 to spread apart the stachion racks 430 and 432 and effectively a patient's ribs;"

112. The retractor according to claim 111 including means for pivotally mounting said second blade on spreader member..	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
	page 38, lines 2-20: " The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624;"

113. The retractor according to claim 106 in which said second blade is self-adjusting.	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
	page 38, lines 2-20: " The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624;"

	page 39, line 23-page 41, line 7: "In operation, the blades 650 and 652 are inserted in an incision in the patient's chest such that the elongated vanes 656 and 657 of the blade 652 that is interconnected to the moveable pivot 625 are positioned under the patient's ribs while the recessed throats 653 and 654 of the blades 650 and 652 are positioned to receive the ribs that are adjacent to the incision. After the blades 650 and 652 are properly positioned, the stem 644 of the blade arm 640 is inserted through the fixed pivot lock 615 into the socket 618 of the fixed pivot 616. Meanwhile, the stem 646 of the blade arm 642 is inserted through the moveable pivot lock 626 and the end of the shoe arm 682 opposite the shoe 680, and into the socket 625 of the moveable pivot 624. The blade 650 that is interconnected to the fixed pivot 616 is then fixed in position by tightening the fixed pivot lock screw 617 to tighten the fixed pivot lock 615 around the stem 644 of the blade arm 640. The rib compression shoe 680 is then adjusted by adjusting the adjustable offset drive screw 636 until the desired compression of the ribs is achieved. The blade 652 that is interconnected to the moveable pivot 624 is then temporarily fixed in position relative to the shoe 680 by tightening the moveable pivot lock screw 627 to tighten the moveable pivot lock 626 around the stem 646 of the blade arm 642. The ribs are then separated and offset by rotating the lever 622 to drive the pinion 621 along the rack 613 until a desired opening width and offset height is realized. Further adjustment of offset height may be obtained by first loosening the moveable pivot lock 626 around the stem 646 of the blade arm 642 and then adjusting the adjustable offset drive screw 636 to cause the shoe 680 and the shoe arm 682 to rotate downwardly in a clockwise direction and, also, cause the blade 652 that is interconnected to the moveable pivot 624 to rotate upwardly in a clockwise direction, until a desired offset is achieved;"

114. The retractor according to claim 113 including mounting means mounting said self-adjusting second blade so that said second blade swings freely relative to said spreader member.	page 36, line 16-page 37, line 18: "Referring to Figures 21 and 22, a ninth embodiment of the access platform 610 of the present invention is shown. The access platform 610 comprises a spreader component 612 that includes a rack 613, a spreader base 614 attached to one end of the rack 613 and a pinion housing 620 slidably received over the rack 613. A pinion 621 that is driven by a lever 622 is rotatably retained in the pinion housing 620 and operably connected to the rack 613. A fixed pivot 616 having a socket 618 formed therein, extends from the spreader base 614. A fixed pivot lock 615 with a lock screw 617 is fixedly connected to the fixed pivot 616. A moveable pivot 624 having a socket 625 formed therein, extends from the housing 620. Rotatably received in and extending from the sockets 618 and 625 are stem portions 644 and 646 of a pair of blade arms 640 and 642. The stem 644 that is received in the socket 618 of the fixed pivot 616 includes a stop 645 formed on its exterior to abut 41 the fixed pivot lock 615 and stop the travel of the stem 644. Branch portions 641 and 643 of the blade arms 640 and 642 extend downwardly from the stem portions 644 and 646 and attach to a pair of blades 650 and 652. The blade 652 that is interconnected to the moveable pivot 624 comprises a recessed throat 654 to capture a rib adjacent to an incision in the patient's chest cavity and a pair of elongated vanes 656 and 657 used to offset a plurality of the patient's ribs. The blade 650 that is interconnected to the fixed pivot 616 comprises a recessed throat 653 used to capture a rib adjacent to an incision in the patient's chest cavity;"
	page 38, lines 2-20: " The branch portion 643 of the blade arm 642 that is interconnected to the moveable pivot 624 extends higher vertically than the branch portion 641 of the blade arm 640 that is interconnected to the fixed pivot 616. (see Figure 22) This construction tends to cause the ribs that are retracted by the blades 650 and 652 to be vertically offset relative to one another. To add additional offset, a torsional component 630 is included on the access platform 610. The torsional component 630 comprises a rib compression shoe 680, a substantially "S" shaped shoe arm 682 connected to the shoe 680 at one end and pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624 at the other end, and an adjustable offset link 632 connected to the pinion housing 620 and operably connected to the shoe arm 682 and shoe the 680. The shoe 680 has an arcuate front profile and a rectangular top profile. A moveable pivot lock 626 with a lock screw 627 is fixedly mounted to the end of the shoe arm 682 that is pivotally connected to the stem 646 of the blade arm 642 that is interconnected to the moveable pivot 624;"

	page 39, line 23-page 41, line 7: "In operation, the blades 650 and 652 are inserted in an incision in the patient's chest such that the elongated vanes 656 and 657 of the blade 652 that is interconnected to the moveable pivot 625 are positioned under the patient's ribs while the recessed throats 653 and 654 of the blades 650 and 652 are positioned to receive the ribs that are adjacent to the incision. After the blades 650 and 652 are properly positioned, the stem 644 of the blade arm 640 is inserted through the fixed pivot lock 615 into the socket 618 of the fixed pivot 616. Meanwhile, the stem 646 of the blade arm 642 is inserted through the moveable pivot lock 626 and the end of the shoe arm 682 opposite the shoe 680, and into the socket 625 of the moveable pivot 624. The blade 650 that is interconnected to the fixed pivot 616 is then fixed in position by tightening the fixed pivot lock screw 617 to tighten the fixed pivot lock 615 around the stem 644 of the blade arm 640. The rib compression shoe 680 is then adjusted by adjusting the adjustable offset drive screw 636 until the desired compression of the ribs is achieved. The blade 652 that is interconnected to the moveable pivot 624 is then temporarily fixed in position relative to the shoe 680 by tightening the moveable pivot lock screw 627 to tighten the moveable pivot lock 626 around the stem 646 of the blade arm 642. The ribs are then separated and offset by rotating the lever 622 to drive the pinion 621 along the rack 613 until a desired opening width and offset height is realized. Further adjustment of offset height may be obtained by first loosening the moveable pivot lock 626 around the stem 646 of the blade arm 642 and then adjusting the adjustable offset drive screw 636 to cause the shoe 680 and the shoe arm 682 to rotate downwardly in a clockwise direction and, also, cause the blade 652 that is interconnected to the moveable pivot 624 to rotate upwardly in a clockwise direction, until a desired offset is achieved;"